Name of Organization: US Forest Service and Cooperators

Type of Organization: Federal Agency

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Project Title: Evaluating the Integrity of Disturbance-Dependent Ecosystems

Project Category: Habitat (Ecological) Protection and Rest

Rank by Organization (if applicable): 0

Total Funding Requested ($): 85,634 **Project Duration:** 2 Years

Abstract:

Extensive areas of disturbance-dependent ecosystems in the Great Lakes basin have been altered by human-development and intervention, including turn-of-the-century logging, subsequent fire suppression, and modern resource consumption. While many GLNPO projects seek to preserve or restore high quality and rare ecosystems, efforts to assess the integrity and health of disturbance-dependent ecosystems across a regional landscape are lacking. We propose to: (1) use a Geographical Information System (GIS) and related ecological data to assess historical and current conditions in disturbance-dependent ecosystems such as former boreal, white pine-oak and spruce-fir forests; (2) map and quantify the integrity of these systems in Northern Michigan, Minnesota, and Wisconsin; and (3) deliver results and data over the web and on CD's.

Geographic Areas Affected by the Project

States:

- [ ] Illinois
- [ ] Indiana
- [x] Michigan
- [x] Minnesota
- [ ] New York
- [ ] Pennsylvania
- [x] Wisconsin
- [ ] Ohio

Lakes:

- [ ] Superior
- [ ] Huron
- [ ] Michigan
- [ ] Erie
- [ ] Ontario
- [ ] All Lakes

Geographic Initiatives:

- [ ] Greater Chicago
- [ ] NE Ohio
- [ ] NW Indiana
- [ ] SE Michigan
- [ ] Lake St. Clair

Primary Affected Area of Concern: Not Applicable

Other Affected Areas of Concern:

For Habitat Projects Only:

Primary Affected Biodiversity Investment Area: Not Applicable

Other Affected Biodiversity Investment Areas:

Problem Statement:

Among the goals outlined in the1996 GLNPO Mining Ideas Report, the GLNPO supports research and management that leads to improvements in (i) the ecological integrity of the Great Lakes basin; (ii) the quality and size of biologically diverse ecosystems; and (iii) the understanding of those involved in managing and protecting ecosystems of ecosystem functions and processes. To this end, projects leading to the identification of high quality ecosystems and elements of ecosystems requiring protection, as well as rare ecosystems such as oak savannas and pine barrens requiring restoration, have been undertaken. However, across this spectrum of protection and restoration, the integrity of extensive acres of disturbance-dependent forested ecosystems has not been assessed or received sufficient consideration for prioritizing restoration needs.

Nearly all of the forests of the Lake States were altered by turn-of-the-century logging. Subsequent fire suppression and, in cases, contemporary logging have lead to millions of acres of disturbance-dependent forests that are grossly outside the historical range of variability in composition, landscape and age structure, and disturbance processes across multiple scales. In particular, the former boreal forest and white pine-oak forests occurring across millions of acres of private and public lands in the Great Lakes Basin may be experiencing severe decline. This decline may be due to forest type conversion, the creation of uncharacteristic landscape patterns through fragmentation, and altered spatial arrangement of forestlands of varying age-class distributions.

Examination of Forest Inventory Analysis (FIA) data cooberates concerns regarding decline of disturbance dependent forests. This analysis suggests accelerated infestation of insects, increasing incidence of defoliation and mortality, and increased senescence of short-lived tree species are contributing to the decline. For example, in twelve-years, mortality in the spruce-fir type increased nearly four-fold in Minnesota. Furthermore, a spruce budworm epidemic has been ongoing for 47 years in Minnesota, whereas historical epidemics lasted only 8-10 years. Spread of the jack pine budworm across this region, and increasing mortality of short-lived xeric oak ecosystems, may again be due to disrupted disturbance regimes, and altered landscape patterns and age-class distributions. Loss of biodiversity and increased fire risks are also associated with these anthropogenic changes.

Proposed Work Outcome:

The approach takes advantage of current research and data sets compiled by cooperators participating in the Great Lakes Ecological Assessment. Using geospatial databases, we will complete analyses, map the locations of disturbance-dependent ecosystems, and rank the integrity of these systems within ecoregions (Subsections and Landtype Associations). Ranking will be based on comparisons of historical and current vegetation, landscape and age-class

structures, natural disturbance regimes, and incidence of insect infestation and natural senescence. Results will be published in scientific journals, posted on the internet, and made available on CD's to private and public organizations.

Project Milestones:	**Dates:**
Project Start	10/2000
Map modern mortality by forest type	04/2001
Map fire, wind, and pest disturbance	07/2001
Map pre-European forest composition	10/2001
Complete analyses of landscape structure	02/2002
Compare modern and historical landscapes	05/2002
Map integrity and restoration priorities	09/2002
Project end	10/2002

☐ Project Addresses Environmental Justice

If So, Description of How:

☒ Project Addresses Education/Outreach

If So, Description of How:

We will use the World Wide Web, newsletter, and symposia to involve and inform the private and public sector.

Project Budget:

	Federal Share Requested ($)	Applicant's Share ($)
Personnel:	48,144	0
Fringe:	7,226	0
Travel:	0	0
Equipment:	0	0
Supplies:	0	0
Contracts:	10,000	0
Construction:	0	0
Other:	0	0
Total Direct Costs:	65,370	0
Indirect Costs:	20,264	0
Total:	85,634	0
Projected Income:	0	0

Funding by Other Organizations (Names, Amounts, Description of Commitments):

Description of Collaboration/Community Based Support:

Support for this project is pledged from the USDA Forest Service and Michigan Technological University. Cooperators from the Michigan and Wisconsin Timber Producer's Association will assist in outreach. Cooperators in the Minnesota and Wisconsin DNR's will assist in data analyses, interpretation, and project outreach. The Great Lakes Ecological Assessment will contribute staff time and facilities to accomplish the goals of this project.